

REMARKS

1. The Examiner's withdrawal of finality of the previous office action and entry of the submission filed 4/18/05 is gratefully acknowledged.

2. The Examiner's pointer on claim listing practice is much appreciated.

3. The Applicant respectfully requests entry of new claims 42-50 and amendments to claims 17, 26, 31, and 38.

Claim 17 is discussed in detail below.

Dependent claim 26 is amended to be consistent with the amendment to claim 17.

Dependent claim 31 is amended to recite a narrower temperature range limitation since the amendment to claim 17 rendered it redundant. Antecedent basis is found on page 16 line 17 of the specification. One skilled in the art would readily recognize the approximate range 10°C to 40°C as about "room temperature."

Claim 38 is amended to include missing punctuation.

Antecedent basis for the new claims 42-45 is found on page 13 lines 15-26 of the specification.

Antecedent basis for the new claims 46-48 is found on page 17 lines 26-27 of the specification.

Claim 49 is an independent claim directed to a rubber-to-metal bonded article selected from a torsional vibration damper, a rubber-viscous vibration isolation damper, a vibration isolator, a vibration isolation mount, a vibration damper, and a coupling in which the sandwiched rubber member resides in a state of compression of at least one percent (1%), in the absence of external compressive forces on the article. Claim 50 further defines the state of compression, elastomer and adjuvant.

35 USC §112 Claim Rejections

4. Applicant acknowledges the Examiner's rejection of claims 17-29 and 31-41 under 35 USC 112. In response, Applicant submits currently amended claim 17.

First, the term "*rigid*" is deleted and the following phrase inserted: "*d. said metal members are substantially undeformable by the force of said state of compression or by the forces applied during assembly or during use.*" Antecedent basis for this amendment is found in the specification at page 2 line 20-22 where it explains

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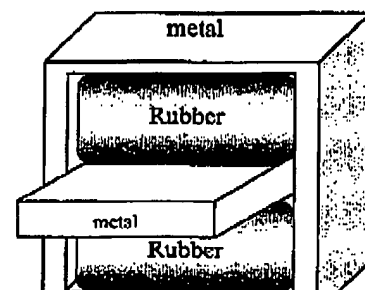
that in the prior art "*compression forces have also optionally been applied to provide further stabilization of rubber-to-metal engagement or to eliminate the tension resulting from shrinkage of the rubber.*" Moreover, the whole specification is based on the proposition that such external compression forces (including those that deform the metal) are not necessary in order to achieve a state of compression in the rubber in the practice of this invention. This limitation clearly defines the scope of the invention by not only limiting the metal to being "*substantially undeformable*" but also defining the degree of undeformability in terms of the usual forces encountered during assembly or during use. One skilled in the art could thus design his metal parts to be substantially undeformable knowing the force arising from the compressed rubber and the forces to be encountered during assembly and use.

Second, the term "*neutral state*" is deleted. Antecedent basis is found in the words "*at least one of*" in original claim 17, which words are also deleted.

Third, "*in the absence of an external compressive force on the article*" is inserted in claim 17. Claim 17 now definitely recites a "*bonded article*" having a "*cured rubber member*" in a "*state of compression*" without "*external compressive forces.*" Therefore, in answer to the Examiner's questions: 1) the state of compression referred to in claim 17 is clearly *after* bonding, although it also necessarily exists before and during bonding as well; and 2) the final bonded article is clearly in a state of compression "*in the absence of an external compressive force.*"

The annular article of claim 33 provides a specific configuration wherein these structural features are easily visualized. The annular rubber member is press fit into the annular gap defined by the two "*substantially undeformable,*" generally cylindrical, metal rings. The rubber can thus reside in a state of compression from say 1% to 60% compression. Though the compressed rubber continuously exerts a radial force on the metal, no external forces are required to maintain the compression, because the perfectly balancing hoop stresses set up in the circular metal parts resist deformation and maintain the annular gap!

For illustrative purposes, this figure shows another simple configuration, that of a rectangular bonded article, wherein two rubber members reside in a state of



compression (vertically compressed) with no external forces and no substantial deformation of the metal. The rubber isolates the metal box from vibrations of the metal tab. The sides of the metal box support the compression forces.

The Applicant respectfully submits that the amendments to claim 17 should remove any indefiniteness regarding the stiffness of the metal or the nature of the compressive state in which the rubber resides. Please note that new claims 46-48 add quantitative limitations which further define the "*state of compression*."

35 USC § 102(b) Rejections

5. Applicant acknowledges the Examiner's rejection of claims 17-19, 21, 23-29, 31-34, and 36-37 under 35 USC 102(b) as being anticipated by Hosking (US 2,409,759). Applicant submits amended claim 17 in response. Hosking does not disclose an article wherein the rubber member resides "*in a state of compression*" "*in the absence of an external compressive force on the article*." To see this requires an understanding of the difference between the Applicant's term "*state of compression*" and Hosking's use of "pressure" and the resulting well known effects on the final article.

Throughout the specification, the Applicant consistently describes compression in terms of a **percent** amount of compression. (e.g. page 4 line 23, page 17 line 25-27). This, as understood by those skilled in the art, requires **deformation** of the rubber from its natural or neutral state. The percentage is understood in the art to be the amount of deformation divided by the original dimension. Thus, Applicant's "*state of compression*" means a certain amount of compressive deformation – in particular, deformation resulting from the forces of press fitting the rubber between two substantially undeformable metal parts. It is well known that rubber deformation is also substantially reversible. Thus a "*state of compression*" clearly means there are significant, measurable, structural effects stored up in the deformed shape of the rubber. These structural effects are absent from Hosking.

Hosking specifically teaches that his rubber is not deformed. Hosking applies "pressure" to his rubber, not "compression." Pressure is measured in pounds per square inch, not percent deformation. (col. 7 line 41). Hosking's pressure is generated by "confining" the rubber, not by deforming the rubber. (col. 7 line 66, col. 9 line 37-39, 66). It is well known in the art that rubber is incompressible when confined under

pressure. Hosking teaches the rubber should be "premolded in a shape adapted to **conform** to that of the metal" (column 7 line 45-46, emphasis added). If tubular (or annular) in shape, Hosking's rubber "**may** be premolded ... to have an outside diameter **slightly** larger than the inside diameter of the ... metal sleeve 24; **or** the central bore of the rubber ... may be ... **slightly** smaller than the outside diameter of said metal rod." (col. 9 line 53-60, emphasis added to show that Hosking's teaching precludes any significant deformation). Hosking generates sufficient pressure to cause adhesion by means of this closely conforming fit between metal and rubber in combination with "a mold which fits snugly around the rubber portions" that are exposed. (col. 7 line 67-68). Hosking's goal is to generate pressure "in such a manner as to **prevent distortion** of the rubber," (col. 7 line 64-65, emphasis added), "said pressure being supported by the mold confining the ends of the rubber." (col 9 line 37-39). After Hosking's article is cured, removed from the mold, and cooled, the pressure on the rubber is necessarily gone; it is clearly not residing in a "*state of compression*." In terms of compressive deformation, Hosking teaches rubber in a neutral state throughout his process and in the final product. At best Hosking's rubber member will clearly be in a neutral state, and very often it will end up in a state of tension from the well known combined effects of flash, compression set, and shrinkage during curing and thermal shrinkage after curing. Hosking does not disclose a rubber member residing in a "*state of compression*."

The data presented in the previously submitted graph (in the Applicant's Submission of April 18, 2005 at paragraph 8) show the existence of significant, measurable, structural effects attributable to the "*state of compression*" limitation. Indeed, the Applicant was directly measuring the "*state of compression*" of the rubber as a function of various cure parameters. This data supports the existence of specific, preferred levels of compression as recited for example in new claims 46-48. In these terms, Hosking's articles have zero remaining compression (or less). The performance benefits of a state of compression have also been discussed in the prior submission (id. at para. 5) and in the specification (page 2 line 17-18). Thus, "*compression*" renders the applicant's invention structurally different from Hosking. Since at least this limitation is absent in Hosking, the requirements of §102(b) have not been satisfied.


35 USC § 103(a) Rejections

6. Applicant acknowledges the Examiner's rejection of claims 20, 22, 35 and 38-41 under 35 USC 103(a) over Hosking in view of Drake et al. Applicant respectfully submits that the currently amended claim 17, and therefore the rejected dependent claims, are now patentably distinct. As explained above, claim 17 recites a bonded, cured rubber member that is *"press fit"* and *"resides between said metal members in a state of compression at a temperature in the range of from about -20°C to about 120°C in the absence of an external compressive force on the article."* Neither Hosking nor Drake teach a press fit rubber member in a state of compression. At best they disclose rubber in a neutral state, but more likely in a state of tension, as explained above and in prior replies. Nor is there any suggestion of how to achieve a state of compression in a bonded part in the absence of adhesive and external forces. Hosking clearly teaches away from doing anything that would deform the rubber enough to leave it in a state of compression. (col. 7 line 64-65). Thus the subject invention differs structurally from any combination of Hosking and Drake and is therefore non-obvious given the lack of suggestion in the references to make the combinations of any of claims 20, 22, 35 and 38-41.

FEE STATEMENT

Any fees required as a result of the amendments and submission of new claims are authorized to be charged to Assignee's deposit account number 07-0475.

Respectfully submitted,


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